



Drinking Water Audit Report

County:	Co. Cork	Date of Audit:	03/04/2014
Plant(s) visited:	Glenduff Public Water Supply (0500PUB1502)	Date of issue of Audit Report:	15/04/2014
		File Reference:	DW2014/157
		Auditors:	Ms. Cliona Ní Eidhin Ms. Yvonne Doris
Audit Criteria:	<ul style="list-style-type: none"> • The <i>European Union (Drinking Water) Regulations 2014 (S.I. 122 of 2014)</i>. • The <i>EPA Handbook on the Implementation of the Regulations for Water Services Authorities for Public Water Supplies (ISBN: 978-1-84095-349-7)</i> • The recommendations specified in the EPA Report on <i>The Provision and Quality of Drinking Water in Ireland</i>. • The recommendations in any previous audit reports. 		

MAIN FINDINGS

- i. *The borehole source of the Glenduff Public Water Supply was found to have been capped since the recent exceedance notification but it did not appear to be adequately sealed. Some work was found to be required around the well head in order to protect it from ingress of surface water and risks from the adjacent roadway.*
- ii. *The Water Service Authority's disconnection of a redundant spring source from the network would appear to have addressed the cause of recent contamination, however, further monitoring was yet to be undertaken to verify this.*

1. INTRODUCTION

Under the *European Union (Drinking Water) Regulations 2014* the Environmental Protection Agency is the supervisory authority in relation to Irish Water and its role in the provision of public water supplies. This audit was carried out in response to the notification by Irish Water dated 13/03/2014 of the failure to meet the *E. coli* parametric value (as specified in Table A of Part 1 of the Schedule of the Regulations) in the Glenduff Public Water Supply (PWS) and the subsequent issuing of a boil water notice on the supply. The detection of coliform bacteria was notified to the EPA on the same date. Where the text refers to the Water Service Authority this refers to Irish Water in accordance with Section 7 of the Water Services (No. 2) Act 2013.

The Glenduff PWS is located approximately 7 km east of Mitchelstown in rural Co. Cork. The supply sources water from a single borehole which has been in use since circa 2002. The borehole was commissioned to replace a spring which had become contaminated from an above-ground source. The spring was abandoned when the borehole was commissioned. The supply produces an average of 3.5 m³/day which serves an estimated population of 10 comprising five domestic dwellings and one farm. Water is pumped from the borehole, treated by chlorination prior to entry into a contact tank and a pressure tank (configured in series). Treatment equipment is located within a small metal house adjacent

to the borehole. The distribution network is short as the houses served are clustered within a small area a short distance from the treatment building.

Photographs taken by Cliona Ní Eidhin during the audit are attached to this report and are referred to in the text where relevant.

The opening meeting commenced at 11:00am at the Glenduff treatment house. The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews with staff, review of records and observations made during an inspection of the treatment plant. The audits observations and recommendations are listed in Section 2 and 4 of this report.

The following were in attendance during the audit and the closing meeting:

Representing Irish Water:
Mr. Ian O'Mahony – Water Infrastructure Lead Below Ground, Irish Water Mr. Kevin Murphy – Water Engineer, Irish Water Mr. Pat Walsh – Senior Executive Engineer, Cork County Council Mr. Patrick Kelly – Water Liaison Engineer, Cork County Council Mr. Paudie Quinn – Water Caretaker, Cork County Council Mr. Dave Sheehan – Executive Scientist, Cork County Council Ms. Eileen Coleman – Executive Engineer, Cork County Council
Representing the Environmental Protection Agency:
Ms. Cliona Ní Eidhin - Inspector Ms. Yvonne Doris – Inspector

2. AUDIT OBSERVATIONS

The audit process is a random sample on a particular day of a facility's operation. Where an observation or recommendation against a particular issue has not been reported, this should not be construed to mean that this issue is fully addressed.

1.	<p>Source Protection</p> <ol style="list-style-type: none"> a. The zone of contribution to the borehole has not been delineated and farms in the locality have not been surveyed or contacted in terms of landspreading activities that could potentially impact on the water quality from the borehole. b. The <i>Cryptosporidium</i> Risk Assessment has been completed for the Glenduff PWS yielding a result of 16, indicating low risk. c. The nearest residence is located approximately 150m up slope from the borehole and is served by a septic tank. The septic tank has not been inspected by the WSA, nor has the private premises been visited to assess potential risks from stored materials such as home heating oil. d. The borehole itself was located within a small chamber beneath an unlocked inspection hatch which was raised some 6 inches above ground level. The inspection hatch cover was not sealed. e. The area immediately surrounding the borehole, including the adjacent road verge, was observed to be without formal drainage channels. It was noted that in heavy rain events, surface water flow could potentially run downslope towards the borehole. (see Photograph 1) f. Borehole drilling logs had not been located by the WSA and details of its construction were not known. From an examination of the well head the borehole shaft was confirmed to be cased. A cap had recently been installed to the well head but it appeared to be laid on top of the shaft rather than adequately sealed. (See photograph 2) The entry point for a pipe/cable to the well shaft was not adequately sealed.
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2	<p>Chlorination and Disinfection</p> <ul style="list-style-type: none"> a. Sodium hypochlorite is brought to the plant in 25l portable canisters and mixed with treated water in the day-tank. Canisters are labelled by the supplier with the date of manufacture; the expiry date was not clearly indicated and relied on the curator knowing the product shelf life. b. Duty and standby chlorine dosing pumps, dosing flow proportionally, with automatic switchover were confirmed to be in place. A chlorine monitor is in place and was reading 0.8 mg/l at the time of the audit. The monitor is alarmed. The alarm is triggered if the level reading on the chlorine monitor drops to 0.2 or below. A triggered alarm leads to shutdown of the plant. c. A chlorine residual of 0.7 is aimed for by the curator in water leaving the plant. d. Daily readings of chlorine levels are taken by the curator at the plant and at the end of the network using the Hach monitor. These are recorded alongside the level recorded on the chlorine monitor. Records were reviewed by the auditors. Prior to the recent disconnection of the spring from the network the takeup of chlorine in the short network was considerable. It was apparent that, since the disconnection of the spring, the levels detected at the end of the network more closely tracked the levels recorded at the treatment house. e. The procedure to be followed by a curator in response to low chlorine levels in the network was not available during the audit.
3.	<p>Treated Water Storage</p> <ul style="list-style-type: none"> a. Apart from the disinfection contact tank and pressure tank within the treatment house there is no storage of treated water on the Glenduff PWS.
4.	<p>Monitoring and Sampling Programme for treated water</p> <ul style="list-style-type: none"> a. The Glenduff PWS is sampled twice per year within the check monitoring programme. Monitoring results for the last few years were reviewed by the auditors and found to be indicative of good raw water quality. Occasional elevated colour, historically, was noted. Very good water transmissivities of circa 97% were noted. Sampling undertaken since the disconnecting of the spring source were reviewed and were indicative of improvement in water quality since this measure was taken.
5.	<p>Exceedances of the Parametric Values</p> <ul style="list-style-type: none"> a. The WSA notified the EPA of the detection of <i>E.coli</i> (5 per 100 ml) and coliform bacteria (109 per 100ml) in a sample taken on 11/03/2014. On investigation, the WSA discovered that a connection to the old spring source had been turned on following leak repair works. untreated water was entering the distribution network. Once this had been identified, the WSA severed the connection between the spring and the distribution network. Subsequent monitoring submitted to the EPA and reviewed during the audit was indicative of improvement in water quality at the tap.
6.	<p>Management and Control</p> <ul style="list-style-type: none"> a. The Glenduff PWS is visited daily by the curator. b. A plant manual has been prepared by the WSA for the Glenduff PWS and is held in the treatment house for reference by the curator. This was reviewed by the auditors and found to include disinfectant delivery records and a number of documented procedures on the management of the plant. c. In the distribution network, the manifold system catering for the domestic connections was inspected by the auditors. The manifold and connections were housed under a single inspection hatch. The auditors noted that the pipework arrangement at the location of the manifold was not labelled. (See Photograph 3) This was noted as a point of concern on this supply as the switching on of an unlabelled pipe was identified as the origin of the March 2014 <i>E.coli</i> & Coliform exceedances.

3. AUDITORS COMMENTS

The Glenduff PWS was found to comprise a groundwater source of apparent good quality with all the required disinfection, monitoring and alarm response plant in place. The Glenduff treatment plant was verified to be well managed and operating well on the date of the audit. Some concerns regarding the vulnerability of the borehole to overland flow during heavy rainfall events and to risks from the adjacent roadway were raised by the auditors during the audit. Investigations undertaken by the Water Services Authority in response to the March 2014 *E. coli* and coliform detections rapidly identified the source of contamination and rectified it quickly allowing the lifting of the boil notice on 15/3/14. This, plus the WSA's proposal to examine other supplies proactively for similar risk, is commendable.

4. RECOMMENDATIONS

Source Protection

1. **Source protection:** The Water Services Authority should take action should to ensure that the borehole source for the Glenduff Public Water Supply is made secure against surface water ingress, risks from the adjacent roadway or malicious damage.
2. **Source protection:** The Water Services Authority should inspect septic tanks and premises in the locality of the borehole in order to assess any potential risks to drinking water quality.

Disinfection

3. **Disinfection:** The Water Services Authority should undertake a period of examination of chlorine residual levels at the plant compared to levels at the end of the network. This should be undertaken with a view to verifying that severing the connection to the redundant spring source has addressed the historically high take-up of chlorine between the treatment plant and the end of the distribution network.

Monitoring and Sampling Programmes

4. **Monitoring and Sampling programmes:** The Water Services Authority should conduct frequent monitoring of water on the Glenduff PWS for a time in order to verify improvement in water quality since the disconnection of the redundant spring source. The Water Services Authority should undertake investigation into any results of concern detected over the course of this monitoring and undertake all necessary actions to address the cause.

Management and Control

5. **Management and Control:** The Water Services Authority should ensure that the following procedures are documented and available in the plant manual for reference by the plant curator (or relief curator) at all times:
 - a. a procedure with regard to checking the use-by date of sodium hypochlorite disinfectant.
 - b. a procedure for the curator response to the detection of low chlorine in the distribution network.
6. **Management and Control:** The Water Services Authority should label the series of pipes at the location of the manifold in the distribution network such that the purpose of each is clearly discernible to the curator, relief curator and any contractors who may be involved in the maintenance of the supply.

FOLLOW-UP ACTIONS REQUIRED BY IRISH WATER

During the audit the Water Services Authority representatives were advised of the audit findings and that action must be taken as a priority by the Water Services Authority to address the issues raised.

The Water Services Authority should submit a report to the Agency within one month of the issue date of this audit report detailing how it has dealt with the issues of concern identified during this audit. The report should include details on the action taken and planned to address the various recommendations, including timeframe for commencement and completion of any planned work.

The EPA also advises that the findings and recommendations from this audit report should, where relevant, be addressed at all other treatment plants operated and managed by Irish Water.

This report has been reviewed and approved by Ms Yvonne Doris Drinking Water Team Leader. Please quote the File Reference Number DW2014/157 in any future correspondence in relation to this Report.

**Report
prepared
by:**

Cliona Ní Licháin

Inspector

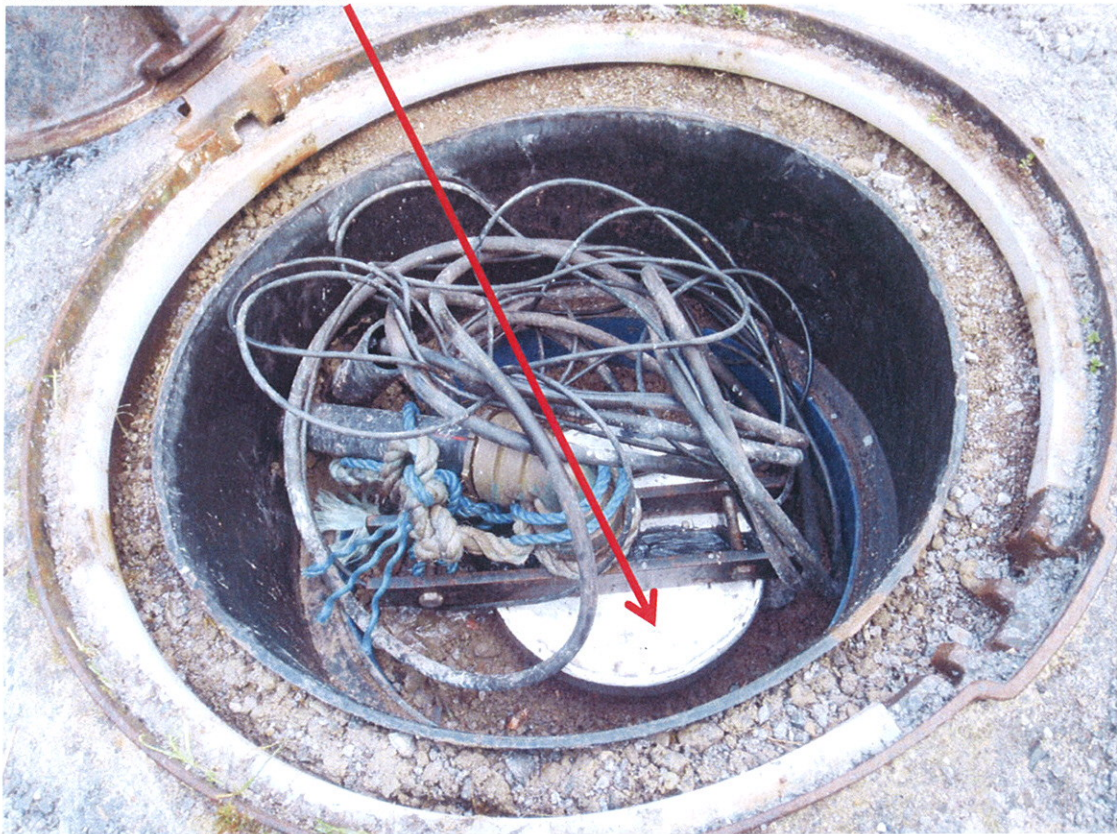
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Photograph 1 – Borehole locality. Note no formal drain at road verge and potential for surface water drainage in the direction of the well head.



Photograph 2 – Well head. Cap laid in place but not sealed allowing potential for ingress to the borehole shaft from the surface.



Photograph 3 – Manifold and individual connections in the distribution network – note the unlabelled pipes. The switching on of an unlabelled pipe was identified as the origin of the March 2014 *E.coli* & Coliform exceedances.

